

to be reckoned as a major pest, and timely remedial measures have to be undertaken by using insecticides like DDT or BHC. Further studies are in progress on this pest.

The author is deeply indebted to the Government Entomologist for affording all facilities during the course of this preliminary investigation.

ENTOMOLOGY SECTION,
AGRICULTURAL COLLEGE,
COIMBATORE,
April 13, 1959.

S. VENUGOPAL, M.Sc.

24. SOME PRELIMINARY NOTES ON THE INSECT LIFE IN SAMBHAR LAKE

The Sambhar Lake, the largest inland water lake in India and situated somewhat east of the Aravalli Range (20° 58' N. and 75° 55' E.), is about 35 kilometres long, 10 kilometres wide. It has an average depth of 0.61 metres during the rains. At the height of the rainy season, the lake covers an area of nearly 2300 square kilometres. It drains an extensive area, totalling nearly 56,300 square kilometres, and is fed by four main streams, viz. Rupnagar, Kharian, Menda, and Khandel. The bottom mud is soft, black, and has a pronounced odour of hydrogen sulphide gas. The water contains in solution chloride, sulphate, carbonate, and bicarbonate of sodium and only traces of calcium carbonate in colloidal form in suspended mud. It differs from sea water in lacking magnesium sulphate, potassium chloride, and magnesium chloride. There is considerable fluctuation in the salinity of water during the year; the salinity may vary within wide limits, from 0.93% to over 16.0% (*vide* Table I below).

TABLE I

Showing the minimum and maximum concentration of various compounds of salt water of the Sambhar Lake, Gudha

	pH	Halogen content %	Salinity %	CO ₂ as H ₂ CO ₃ mg/L	O ₂ mg/L	Na ₂ SO ₄ %	NO ₂ CO ₂ %	NaCl %	SO ₄ %
Minimum ..	7.4	0.52	0.93	34.9	13.8	2.41	0.66	0.89	0.6
Maximum ..	9.5	7.10	16.40	135.4	45.0	6.6	3.94	14.6	9.1

I have been studying the insect life of the lake for the past several years and have made large collections and observations on their habits

and ecology. The insect life of the lake falls under two broad categories, viz. the true lake forms and the shore inhabitants. Among the true lake species we have the aquatic Heteroptera like *Cydnus ater*

TABLE II
Seasonal distribution of various insects with reference to salinity in different months

Name of species	Salinity				
	July-Aug. 0.0-0.96%	Sept.-Oct. 2.81-4.61%	Nov.-Dec. 7.2-8.6%	Jan.-Feb. 9.9-10.4%	March-Apr. 11.1-16.4%
OLIGOHALINE SPECIES					
<i>Cybister tripunctatus asiaticus</i> ..	-----	-----			
<i>Eretes stiticus</i> ..	-----	-----			
<i>Hyphoporus severini</i> ..	-----	-----	-----		
<i>Cydnus ater</i> ..	-----	-----	-----		
<i>Cydnus pilosus</i> ..	-----	-----	-----		
<i>Sphaerodema rusticum</i> ..	-----	-----			
<i>Hydrometra greeni</i> ..	-----	-----			
<i>Sigara jeistanensis</i> ..	-----	-----	-----		
<i>Sigara substriata</i> ..	-----	-----	-----		
<i>Enithares indica</i> ..	-----	-----	-----		
<i>Anisops sardea</i> ..	-----	-----			
<i>Micronecta proba</i> ..	-----	-----	-----		
EURYHALINE SPECIES					
<i>Berosus indicus</i> ..	-----	-----	-----	-----	-----
<i>Ephydra macellaria</i> ..		-----	-----	-----	-----
<i>Eristalis</i> sp. ..		-----	-----	-----	-----
<i>Chironomus indent</i> ..		-----	-----	-----	-----
<i>Polypodium</i> sp. ..		-----	-----	-----	-----

Dist., *Cydnus pilosus* H.S., *Sphaerodema rusticum* Fabr., *Hydrometra greeni* Kirk., *Enithares indica* Fabr., *Sigara jeistanensis* Dist., *Sigara substriata* Dist., *Anisops sardea* H.S., and *Micronecta proba* Dist.

These species are oligohaline and thus occur in the lake only during the rains, viz. from July to November. Of the four species of Coleoptera so far collected by me, *Cybister tripunctatus asiaticus* Reg., *Eretes stiticus* Linn., and *Hyphoporus severini* Reg. are also oligohaline and occur only up to October. *Eretes stiticus* is a widely distributed species, known from Africa, tropical and subtropical Asia, Australia, and the Pacific coast of America. The beetle *Berosus* (*Enophlurus*) *indicus* is euryhaline and is known from the Indo-Australian and Ethiopian regions. The Diptera include the euryhaline *Ephydra macellaria* Eggers, *Eristalis* sp., *Chironomus* sp., and *Polypodium* sp.

In addition to these true aquatic forms found in the lake proper, we also find a large number of shore insects, which move seasonally from the shore into the nearly dry lake bed. As the water of the lake evaporates during summer, these species move with the receding edge of the water to the centre of the lake, and with the onset of the rains and the filling up of the lake again move back to the periphery. They are all hygrophile forms and include *Opatroides punctulatus* Bould., *Coniocleonus* sp., *Pycnodactylus* sp., *Cicindela catena* Fabr., *Menochilus 6-maculatus* Fabr., *Isoloxantha fuscipennis* Blair, *Graptostethus dixonii* Dist., *Ectomocoris cordiger* Stal., *Labidura riparia* P., *Gryllotalpa africana* Bean., and *Chrotogonus trachepterus* Blach.

The oligohaline species, being unable to tolerate high salinity, naturally occur in the lake only during the rains, when the salinity is relatively low. After October, with the cessation of the rains, the salinity increases with the evaporation of water, and most of the oligohaline forms disappear as adults and larvae from the water. There is then a succession of the euryhaline forms. The occurrence of different insects at salinities ranging from 0.96% to 16.4% in the lake shows that insects are capable of inhabiting highly saline waters. Mere salinity does not seem to be an insurmountable barrier to their distribution.

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RAJ RISHI COLLEGE,
ALWAR,
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INDER CHAND BAID